

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
23 September 2004 (23.09.2004)

PCT

(10) International Publication Number
WO 2004/081025 A3

(51) International Patent Classification⁷: G01N 33/68,
33/53, B01J 19/00, C12N 15/10, C07K 7/00

(21) International Application Number:
PCT/GB2004/001016

(22) International Filing Date: 10 March 2004 (10.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0305448.3 10 March 2003 (10.03.2003) GB

(71) Applicant (for all designated States except US): TCP
INNOVATIONS LIMITED [GB/GB]; 9 St John's Street,
Duxford, Cambridge CB2 4RA (GB).

(72) Inventor; and

(75) Inventor/Applicant (for US only): GRAINGER, David,
John [GB/GB]; TCP Innovations Limited, 9 St John's
Street, Duxford, Cambridge CB2 4RA (GB).

(74) Agent: ROQUES, Sarah, Elizabeth; J.A. Kemp & Co.,
14 South Square, Gray's Inn, London WC1R 5JJ (GB).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

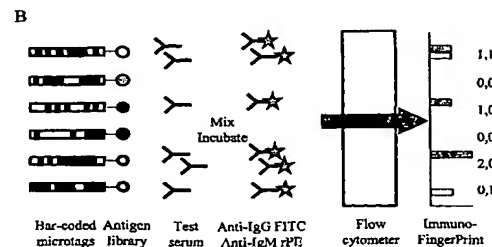
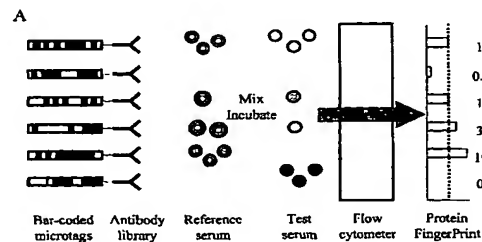
Published:

— with international search report
— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
2 June 2005

[Continued on next page]

(54) Title: DIFFERENTIAL MEGAPLEX IMMUNOASSAY



(57) Abstract: The present invention relates to methods of assaying the levels of proteins or antibodies in a test sample. In particular, the present invention relates to a method of determining the relative abundance of a plurality of proteins in a test sample compared to a reference sample, the method comprising: (a) providing a reference sample comprising a plurality of labelled proteins; (b) incubating a plurality of tagged antibodies capable of binding components of the reference sample with (i) a mixture of the labelled reference sample and the test sample and (ii) the reference sample alone, under conditions suitable for the binding of said antibodies to their targets; (c) comparing the amount of labelled protein bound to individual antibody tags in the presence and absence of the test sample.

BEST AVAILABLE COPY

WO 2004/081025 A3

WO 2004/081025 A3



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International Application No
PC/GB2004/001016

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G01N33/68 G01N33/53 B01J19/00 C12N15/10 C07K7/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 G01N B01J C12N		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, BIOSIS, EMBASE, MEDLINE		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/39210 A (MILLER SAMUEL ; HUMPHERY SMITH IAN (AU)) 5 August 1999 (1999-08-05) abstract; claims	1-12
X	HAAB B B ET AL: "PROTEIN MICROARRAYS FOR HIGHLY PARALLEL DETECTION AND QUANTITATION OF SPECIFIC PROTEINS AND ANTIBODIES IN COMPLEX SOLUTIONS" GENOME BIOLOGY (ONLINE), XX, GB, vol. 2, no. 2, 2001, page COMPLETE, XP001147826 ISSN: 1465-6914 abstract	1-12
X	WO 00/07024 A (BUGELSKI PETER JOHN ; YALLOP RHIANNON (GB); SMITHKLINE BEECHAM PLC (GB) 10 February 2000 (2000-02-10) the whole document	1-12
-/--		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 24 September 2004		Date of mailing of the international search report 30. 03. 05
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Stricker, J-E

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB2004/001016

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	BRINDLE JOANNE T ET AL: "Rapid and noninvasive diagnosis of the presence and severity of coronary heart disease using 1H-NMR-based metabonomics." NATURE MEDICINE, vol. 8, no. 12, December 2002 (2002-12), pages 1439-1444, XP002975960 ISSN: 1078-8956 cited in the application abstract	
P,X	----- EP 1 319 954 A (CT NAT DE GENOTYPAGE) 18 June 2003 (2003-06-18) abstract; claims -----	1-12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2004/001016

Box II Observations where certain claims were found unsearchable (Continuation of Item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; It is covered by claims Nos.:

1-12

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/ GB2004/ 001016

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-12

Methods for determining the relative abundance of a plurality of proteins or for detecting a plurality of immunoglobulins.

2. claims: 13-21, 41-44

Mixture of peptides, library and kit containing a plurality of antigens or a library of peptides

3. claims: 22-40

Method of detecting a plurality of immunoglobulins and method of detecting the presence of, or susceptibility to, a disease

4. claims: 45, 46

Method of reducing the redundancy and bias of an antibody-expressing phage library

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP2004/001016

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9939210	A	05-08-1999	AU 740830 B2	15-11-2001
			AU 2259799 A	16-08-1999
			WO 9939210 A1	05-08-1999
			CA 2319828 A1	05-08-1999
			EP 1051624 A1	15-11-2000
			JP 2002502038 T	22-01-2002

WO 0007024	A	10-02-2000	EP 1101114 A2	23-05-2001
			WO 0007024 A2	10-02-2000
			US 2002142354 A1	03-10-2002

EP 1319954	A	18-06-2003	EP 1319954 A1	18-06-2003
			AU 2002366693 A1	23-06-2003
			CA 2470083 A1	19-06-2003
			EP 1454143 A2	08-09-2004
			WO 03050544 A2	19-06-2003
